

MAUS - Bug #344

Enge derivatives slow to calculate

23 February 2011 17:14 - Rogers, Chris

Status:	Open	Start date:	23 February 2011
Priority:	Normal	Due date:	
Assignee:	Rogers, Chris	% Done:	0%
Category:	Fields	Estimated time:	0.00 hour
Target version:	Future MAUS release		
Workflow:			
Description			
<p>You will need g4mice version 2-4-1 to do this.</p> <p>So there are two pieces of code that talk to each other:</p> <p>In \$MICESRC/Interface/include/MathUtils.hh there is a class called Enge</p> <p>In \$MICESRC/BeamTools/include/BTMultipole.hh there is a class called BTMultipole</p> <p>The code in Enge calculates something called Enge function plus analytical derivatives. The code in BTMultipole uses the analytical derivatives to calculate a field. There is a recursion relation that derives from Maxwell's equations allowing one to use the field profile on-axis to generate field profiles off-axis. At the moment this is rather slow, and could certainly be optimised. The slowness is likely to be caused by too many calls to exp(x)... see what you think.</p> <p>One solution might be to add a function that calculates not just Enge nth derivative but all derivatives of Enge from n through to 0 all at once. Can probably reuse the exp(x) call better that way. One interesting thing to play with is gprof which allows to do code profiling...</p> <p>Essentially though, have a play and see what you come up with.</p> <p>There are existing unit tests in \$MICETESTS/gUnit that should not be broken by whatever you are doing. Also an application test in \$MICETEST/Integration/Simulation/Multipoles/</p> <p>I attach to help a cards file and a geometry file that can be used to run the simulation. If you have g4mice-2-4-1 running, just put the cards and geometry file into some directory. Do</p> <pre>source ~/setupmice.csh mkdir some_directory cd some_directory</pre> <p>Copy the attached Multipole.dat and cards into some_directory, then</p> <pre>\$MICESRC/Applications/Simulation/Simulation cards</pre> <p>This should get the simulation going, fire a whole load of neutral particles (neutrons) on a rectangular grid and write out the particle data at a few points - with position, momentum and field values in the output.</p> <p>Let me know, there's probably some stuff that needs clarifying here.</p>			

History

#1 - 24 February 2011 08:32 - Rogers, Chris

- Assignee changed from Blot, Summer to Rogers, Chris

#2 - 26 May 2011 15:11 - Rogers, Chris

- Project changed from G4MICE to MAUS

- Category deleted (BeamTools)

#3 - 27 May 2011 11:11 - Rogers, Chris

- Category set to Fields

- Target version set to Future MAUS release

Files

cards	230 Bytes	23 February 2011	Rogers, Chris
Multipole.dat	1.96 KB	23 February 2011	Rogers, Chris